

# 100% Pure

1. A micro surgical cutting instrument configured as scissors comprising:

- a housing configured as a handle and a sliding device disposed therein;
- a probe configured as a hollow needle with a rod co-axially disposed therein;
- a cutting device disposed at a distal end of the rod and configured as scissors having two cutting members, each cutting member having one of an arcuate and straight configuration, each cutting member provided with a cutting blade and a cutting edge which, in an open position and extending from the distal end of the cutting blades towards the distal end of the probe, oppose each other at an acute angle such that when the probe is moved in the direction towards a tip of the cutting members the cutting edges engage each other to establish a cutting action.

2. The microsurgical cutting instrument of claim 1, further comprising at least one light guide which is co-axially disposed within the tube-shaped probe; and wherein said optical guide is connected at one end to a light source and at the other end is configured for illuminating a cutting action by the two cutting blades that correspond to each other in a closed or open position of the scissors.
3. The microsurgical instrument of claim 1, further comprising at least one optical guide supported co-axially within the probe and projecting from the distal end of the probe for optical recording of an immediate operating field and at the other end is connected to a camera and a corresponding monitor for projecting visual images of the optical recordation.
4. The microsurgical instrument of claim 1, wherein the at least two cutting blades projecting from the tube-shaped probe are jointly bent at a radius  $R$  relative to the longitudinal axis of the probe in the direction of a tip of the cutting blades at an acute bending angle  $\alpha$ .
5. The microsurgical cutting instrument of claim 4, wherein a length of the two cutting blades starting from the front face of the probe and extending along the longitudinal axis to the tip of the cutting blades is not less than the height which extends from the outer diameter of the probe to the tip of the cutting blades.

6. The microsurgical instrument of claim 4, wherein a length of the two cutting blades starting from the front face of the probe and extending along the longitudinal axis to the tip of the cutting blades is less than the height which extends from the outer diameter of the probe to the tip of the cutting blades.
7. The microsurgical instrument of claim 1, wherein each of the cutting blades disposed at the cutting members in the direction towards a tip of the cutting blade is configured as a straight cutting blade, and wherein in an open position of the cutting members, the two cutting edges starting from the tip of the cutting members in the direction of the probe correspond along a distance at an acute angle  $\gamma$ .
8. The microsurgical instrument of claim 1, wherein at a distance from the front face of the probe a cutting blade is disposed at each cutting member, each cutting member is configured in the shape of a lance and tapering in the direction toward a tip of the cutting member; and wherein the two cutting blades are jointly bent upwards relative to the longitudinal axis of the probe at an acute angle  $\alpha$  and at a radius R.

9. The microsurgical instrument of claim 8, wherein the cutting edges which are disposed at the cutting blades are corresponding to each other at an open position of the cutting members starting from the tip of the cutting members in the direction of the probe along a distance  $D$  at an acute angle  $\gamma$ .
10. The microsurgical instrument of claim 1, wherein the two cutting blades disposed at the cutting members which are projecting from the probe are configured in the shape of an arcuate hook and are tapering in the direction of a tip of the scissors such that the blades corresponding with each other are brought into a cutting engagement at an inner side of each cutting blade by means of a piece when the probe is moved in axial direction.
11. The microsurgical instrument of claim 10, wherein a length of the hook shaped cutting blades extending from the front face of the probe along the longitudinal axis to the tip of the scissors with respect to the height extending from the arc-shaped outer edge of the cutting blades to the tip of the scissors is the same or larger.

12. The microsurgical instrument of claim 1, wherein the two cutting blades in a closed position and projecting from the probe are jointly bent relative to the longitudinal axis of the probe in the direction of a tip of the scissors at a bending angle  $\alpha$  of about 40° to 60° and at a radius R of about 1.8 mm to 2.0 mm, and wherein a length extending from the front face of the probe to the tip of the scissors is about 2.5 mm to 3.8 mm and the height extending from the outer wall of the probe to the tip of the scissors is about 1.7 to 2.0 mm
13. The microsurgical instrument of claim 1, wherein the two cutting blades in a closed position and projecting from the probe are jointly bent relative to the longitudinal axis of the probe in the direction of a tip of the scissors at a bending angle  $\alpha$  of 60° and at a radius R of 2.0 mm, and wherein a length extending from the front face of the probe to the tip of the scissors is 3.0 mm and the height extending from the outer wall of the probe to the tip of the scissors is 1.55 mm
14. The microsurgical instrument of claim 1, wherein the two cutting blades projecting from the probe are jointly bent directly at the front face of the probe relative to the longitudinal axis of the probe at a bending angle  $\alpha$  of about 65° and a radius R of about 1.5 mm to 1.8 mm towards the tip of the scissors, and wherein the length extending from the front face of the probe

to the tip of the scissors and the height extending from the outer wall of the probe to the tip of the scissors are in the range of 1.5 mm to 1.8 mm.

15. The microsurgical instrument of claim 1, wherein at an open position of the cutting members the distance extending from a tip of each of the cutting members in the direction of the probe is about 1.0 mm to 2.0 mm, preferably 1.5 mm and an opening angle  $\gamma$  is about  $9^\circ$  to  $16^\circ$ , preferably  $12^\circ$ .
16. The microsurgical instrument of claim 1, wherein the two cutting blades with integrally formed blade tips are crossed in an open position corresponding to each other at a crossing angle  $\gamma'$  of about  $1^\circ$  to  $3^\circ$ , preferably  $1.4^\circ$ .
17. The microsurgical instrument of claim 1, wherein in a closed position of the scissors the two cutting blades with integrally formed blade tips jointly form a round tip of the scissors with a radius  $R'$  in the range from 0.01 mm to 0.03 mm.
18. The microsurgical instrument of claim 1, further comprising:
  - a. a light guide which is connected at one end to a light source and which is axially supported in the probe is associated at a distance with the two cutting members; and

- b. wherein the light guide is configured for illuminating the two cutting blades that are configured upwardly bent or straight when the scissors are at an open position or at a closed position; and
  - c. an optical guide co-axially supported in an optical channel extending co-axially in the probe; and
  - d. wherein the optical channel supporting the optical guide is configured at a distal end for optical recordation of the surgical procedure; and
  - e. wherein another end of the optical channel supporting the optical guide is connected to a camera, which is connected to a monitor screen for visually presenting images from the surgical field.
19. Use of the microsurgical instrument of claim 1 as an ophthalmologic scissors, particularly for insertion into the vitreous humor of an eye and the treatment of retinal diseases.
20. Use of the microsurgical instrument of claim 1 as a surgical scissors for the insertion into the body cavities of a living being for carrying out surgery.
21. Use of the microsurgical instrument of claim 17 as an ophthalmologic scissors for the insertion into the vitreous humor of an eye and the treatment of retinal diseases

22. Use of the microsurgical instrument of claim 17 as a surgical scissors for the insertion into the body cavities of a living being for carrying out surgical procedures.

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